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CONTAGIOUSNESS AND CONTROL OF LEPROSY.

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THE CONTAGIOUSNESS AND CONTROL OF LEPROSY.¹

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IT should be wholly unnecessary, but I feel that it is due to myself, to state that it is of course impossible to present in any proper form the important subject assigned to me in the inadequate time allotted me. I could in a fraction of it make the categorical statement that leprosy is a contagious disease, and that it has never been, and never can be controlled except by national laws of isolation; but the only and proper reply by those of a contrary opinion to such a presentation would be a denial as simple and categorical. Yet I can scarcely do more than this in my fifteen minutes. You see, therefore, the impossibility of making more than the briefest mention of the evidence upon which my opinions are based. I can only present in the baldest way the text for the discussion which is invited.

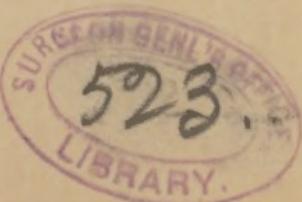
It will be well to consider first what should constitute the proof of the contagiousness of a disease.

This should be based upon the following points :

- (1) The history of its action upon communities or nations.
- (2) The study of its action upon individuals.
- (3) Its resemblance to other affections generally regarded as contagious.
- (4) The establishment of a satisfactory cause of such contagion.
- (5) The influence of control upon its history and course.

Let us apply these test questions to the disease we are considering.

¹ Read at the Congress of American Physicians and Surgeons at Washington, May 30, 1894.



I. THE HISTORY OF ITS ACTION UPON COMMUNITIES AND NATIONS.

You know as well as I the history of its course in Mediaeval Europe. Introduced from the East, the boundless home of so many scourges, it became a pestilence of so overwhelming proportions, that no influence of heredity alone could possibly account for its spread. Many thousands of lazarettos were erected to care for it, and the sternest laws enacted to control it. Belief in its contagious nature was then universal. It lingers yet in by-places and border districts of Europe, whilst in its old seats in the Orient it still plays havoc with mankind. In India, it is estimated, there are two hundred and fifty thousand lepers to-day.

This glance backwards shows us how prone are the human tissues to the inception of the disease under favorable conditions, without distinction of race. But it is in the history of its introduction and course among virgin nations in our own day that this subject may be best studied. The extraordinary rapidity of its spread in the Hawaiian Islands can no more be accounted for on other grounds than its infectious nature, than can the appalling ravages of measles among the people of the Faroe Islands when first imported thither. The peculiar social customs of the Sandwich-islanders will readily account for the vast percentage of those affected. A study of its recent introduction into British Guiana and Trinidad demonstrates in the same conclusive manner that its rapid increase among those peoples could not possibly be accounted for, except by infection from person to person. And in still smaller communities this method of dissemination is even more strikingly illustrated, as witnessed in New South Wales, in Parcent, Spain, in Cape Breton, and in its revival in Louisiana. References to such modern instances might be largely multiplied, but these are enough; for if it can be demonstrated that the course of the disease in one nation, or in one small commu-

nity, can be reasonably explained only through its contagious and infective nature, we need seek no other explanation of its ravages in all lands and all ages.

II. THE STUDY OF ITS ACTION UPON INDIVIDUALS.

Extraordinary difficulties stand in the way of the settlement of our question by a positive demonstration of its capabilities of transference from person to person on account of its long period of incubation. We expose a person to the emanations of variola, and we see the result in a few days; to contact with another infected with syphilis, and the results declare themselves in a few weeks; to contact with the matieries of tuberculosis, and the effects may be apparent in a few months; but with leprosy we have reliable data to prove that the disease may not declare itself for years, two, five, or even ten, after a person has been exposed to its influence. Such a retardation of the tangible effects of contagion renders direct historical proof in individual cases almost an impossibility. Again, the tissues of other animals than man, already tested, show themselves utterly indifferent to inoculation experiments, so that we get no response to such methods of investigation. Let us hope ere long some animal as susceptible to the bacillus of lepra, as is the guinea-pig to that of tuberculosis, may be discovered. The possibilities of using human tissues for such a demonstration in satisfactory sufficiency is too remote for serious consideration. It is true that such experiments have been made. I have seen it claimed that thirty-six persons in Norway and Italy were formerly inoculated and without result, but I am unacquainted with the details of the experiments, whether active bacilli were employed or not, and do not know how long these persons were kept under observation subsequently. The results were simply negative, and therefore without positive value. Who knows that the artificial inoculation of syphilis conducted in the same way might not result in similar failure. Consider the

history of such experiments with favus. Before a certain date attempts to transfer the disease from one host to another at will were almost always unsuccessful. Now that we know how to do it, this is accomplished with certainty. One inoculation practised by a competent person and in a proper manner of recent date has, as you know, been followed by leprosy. You are all familiar with this experiment of Arning at Hawaii — how pus from a leprous ulcer containing bacilli was injected into the skin, and a bit of leprous tubercle was transplanted into the arm of a condemned criminal, who was then isolated; and how three years subsequently leprosy declared itself, and progressed to full development. Unfortunately the experiment cannot be considered absolutely conclusive, as the victim might have been infected beforehand. But it is not likely to be soon repeated.

We must rely, therefore, upon data of clinical nature for our evidence. We shall find this partly in a careful study of the beginnings of endemics of the disease in small communities, as in that of Louisiana, Cape Breton, and Trecadie, as detailed by myself elsewhere;² in the reports of Hawaiian physicians of its dissemination throughout those islands; in the account of its recent importation into a small village in Spain, by Zuriaga, and in the cases recently cited by Dr. Loraud at a late meeting of the Vienna Dermatological Society. Another class of evidence is that of the acquisition of the disease by immigrants of non-leprous nationality into leprous countries, but of this there are so many instances on record that I need only allude to it. More important is the fact of the frequent development of the disease among the personal attendants of non-leprous stock upon lepers. I will mention a few such instances of recent occurrence. A nun, and a ward-tender in a Guiana lazaretto became lepers. In Russia three clergymen from healthy districts became infected after removing to leprous districts and associ-

² American Journal of Medical Sciences, October, 1882.

ating with lepers. In Bergen two ward-tenders have become lepers. In New Orleans a priest has acquired the disease. In Hawaii twenty-five white residents are lepers, of whom two are physicians, and three priests, and Father Damien, at last. Twenty of the ward-attendants at Molokai have become affected. Who would for a moment think of explaining such occurrences in hospitals for syphilis except through contagion? The case of Father Damien alone, to cite the one best-known example, is enough to establish the contagious nature of the affection, and to outweigh limitless data of a negative character.

III. RESEMBLANCE TO OTHER AFFECTIONS GENERALLY REGARDED AS CONTAGIOUS.

There are two diseases to which leprosy bears a strong likeness, namely, tuberculosis and syphilis. All three of them are still mighty scourges of the human race, and prevail over all parts of the earth. Two of them have had periods of intensified activity within historic epochs in Europe, raging as vast national epidemics. The other has done its fatal work uniformly and incessantly, never exhibiting such extraordinary and spasmodic effects as to deserve the title of pestilence. They are slow in their development and course, and their effects upon the cutaneous tissues are manifested by the most pronounced lesions the skin is capable of exhibiting. They affect nearly all the other structures of the body as well, showing respectively predilections for special tissues, and eventually profoundly impress the whole economy. The anatomical changes in the cutaneous tissues produced by them, although not identical, are sufficiently analogous to have been placed in one group by pathologists, before the similar causative element of the same had been demonstrated. One of them has always been regarded as contagious, another was uniformly considered as such whilst it was most active in its destruction among civilized nations, and until overcome by the universally

enforced practice of segregation or isolation mankind outgrew its dread of it, and physicians in later times their knowledge of it. The other has only within the latest time come to be generally recognized to be infectious. All three have been held to be hereditary affections, but as their real nature has become at last understood, it may be said that heredity, although not improbable, is no longer essential to explain their continuance among mankind, for if a disease be proved to be contagious, its alleged hereditary character is certainly an unnecessary explanation of its endemic or epidemic occurrence, and contagion is a much more direct and easily understood method of transference from individual to individual than hereditary transmission. But if a disease be both hereditary and contagious, it is far more important to recognize the latter principle, because its effects are more preventable by State and professional control. All three affections are alike essentially of non-venereal nature, although one of them is so frequently transferred through venereal relations. Their strong resemblance to each other suggests an intimate relationship in etiology and pathology.

IV. ESTABLISHMENT OF A SATISFACTORY EXPLANATION OF ITS CONTAGIOUSNESS.

With the discovery by Hansen of the *bacillus lepræ*, the cause of its contagious nature was demonstrated as clearly as was that of tuberculosis earlier by the similar discovery of Koch. That of syphilis remains to be conclusively established. That this has not yet been accomplished in no measure invalidates the presumption that it will be. We simply await the requisite knowledge of reagents. This will surely come, and then we shall have completed the proof of the close analogy of these three great diseases in all points.

Leprosy is pre-eminently a bacillus disease, for this organism is found in rich abundance in human tissues — chorium, mucous membranes, nerves, blood-vessels,

ovary, testicle, glands, and the great organs; in the blood, lymph, tears, saliva, nasal and intestinal mucus, milk, vaginal secretions, the discharges of ulcers, and all cutaneous lesions, excepting those secondary to nerve changes. Could any infectious material be more generally or favorably distributed for direct transference to other hosts? How can any one who admits the infectious properties of the tubercle bacillus reasonably deny the same quality to that of leprosy, or seek a more rational explanation of its extension among mankind? And although we have yet to learn how to make pure cultures of *bacillus lepræ*, as we can with that of tubercle, as well as to discover an animal as responsive to its action as is the guinea-pig to that of the latter, yet our ignorance upon these points with regard to the infective matencies of that still more contagious third affection, syphilis, is still more profound as yet. Should we ask in these days more substantial proof of the infectious, or contagious, or inoculable character of any affection than the demonstration of its bacillus nature?

V. INFLUENCE OF CONTROL UPON ITS HISTORY AND COURSE.

Let us now consider what has been the effect of the opposing opinions held from time to time by our profession concerning its contagious character upon its course among civilized nations. You know as well as I the views with regard to its unclean and infectious nature among Biblical nations and in Mediæval Europe. How the leper was segregated, regarded as a moral monster, forbidden to pass through public ways without a special garb, or bell, or clapper, and how the monks in charge of lazarettos were obliged to wear upon their breast the red letter L. In later centuries when the disease had been thus controlled and confined to a few European districts, the belief grew up, chiefly through the conclusions of Boeck and Danielson in Norway, and the reports of physicians from various

regions, mainly of negative character, collected by Virchow and the English College of Physicians — that it was not contagious, but was endemic because hereditary. Scarcely any one thought of questioning this dictum. At the meeting of the first International Medical Congress, held at Philadelphia in 1876, I called attention to the prevalence of the disease in the United States to a greater extent than was generally known, and again in 1882 I presented a paper upon the subject to the American Dermatological Association. My conclusions that the disease was increasing to an alarming extent in this country, and that it was contagious, found then but few supporters among my colleagues. Since then professional opinion has greatly changed. You have heard just now from Dr. Hyde how many important foci of the disease lie within and close around our borders. You know the story of Hawaii and Molokai, the conversion of the profession there largely to the belief in its contagious character, and the fatally tardy efforts of the Government to control it by isolation.

In Norway and Sweden, that nursery of the modern doctrine of non-contagion, where the disease had increased in consequence to an alarming extent, a change of policy has taken place. In 1885 the Government passed laws authorizing the transfer and confinement within lazarettos of all lepers who are unwilling or unable to be isolated elsewhere in such manner as to prevent contagion in the family. It permits also the compulsory separation of married people. Since then the disease has been constantly diminishing. In 1870 the number of cases in Norway was 2,607 ; in 1893 it had been reduced to 800.³

³ Prof. C. Boeck, of Christiania, under date April 30, 1894, wrote me as follows : "The chief contents of the actual law on lepra and lepers in Norway, of June 6th, 1885, is the following: 'Poor lepers, who are supported by the parish, ought, as a rule, to be isolated in the public hospitals for leprosy.' When such poor lepers are not isolated in the said hospitals, they should be lodged in separate rooms (in their homes) or cared for in such a manner as 'the sanitary commission' after the circumstances find to be safe. In the

In the Russian Eastern Maritime Provinces the disease has become so prevalent that lazarettos have been established in several places. In New South Wales it has increased so much of late among European residents that a law for compulsory isolation was adopted in 1890. In Trinidad there were three cases in 1805, 860 in 1878. In British Guiana there were 105 cases in 1860, last year there were 1,000 cases.

Thus the disease shows itself increasing rapidly wherever it is granted free license, and diminishing where properly controlled. The late Dr. Morrell Mackenzie, in his essay on "The Dreadful Revival of Leprosy," said, "It is impossible to estimate the total number of lepers now dying by inches throughout the world, but it is certain that they must be counted by millions." This vast destruction of human life and the incalculable misery the disease is producing among mankind is, I believe, a direct consequence of the license which has been granted it by our profession and the nations under the mistaken faith in its non-contagious character.

But how is such unbelief explicable, how is any diversity of opinion as to the communicability of the affection possible in the face of the facts I have thus briefly laid before you? Why should leper commissions be still seeking some other explanation, and one of the most distinguished surgeons of the day still maintain that it is caused by one article of diet, and others cling to the doctrine of heredity as the all-

cause of pauper lepers, however, the 'commissioners of paupers' should mind not to separate married couples who desire to live together. Nevertheless, the decision of the commissioners is valid, even if it involves such separation, where the decision is approved by the 'amtmann' (highest civil authority), after consulting the parish clergyman and district physician. Even other lepers (not paupers) may, by 'the sanitary commission,' be ordered to live in safe separation from their families and other people, which, however, must not interfere with married couples living together. If they do not obey this order they can be isolated in a hospital. The isolation, according to this law, may, if necessary, be carried out by the assistance of the police. Rooms, clothes and bedding, etc., which have been used by any leper, must not be used by or disposed of to others without previous disinfection, as decided by the (local) 'sanitary commission.'"

sufficient cause of its continued existence? Partly, in my opinion, because of the prolonged incubative stage of the disease, and the wholly unwarranted reliance upon data of negative character. Just as strong evidence of the kind can be adduced against the contagious nature of tuberculosis and syphilis. X, a leper, lies in a hospital bed next to V, with syphilis. Their skins are abundantly occupied by the lesions of their respective affections in all stages of development. Ward-tenders, nurses, and physicians care for them with like indifference for months, and ordinarily with no ill results to themselves. The same patients have also lived for months, it may be, in the same condition with their families, and yet the latter have not contracted the disease. Do you not all know this to be true of syphilis in thousands of instances, and yet do you use them as evidence of its non-contagiousness? Why then apply such data to leprosy? On such negative evidence both affections should be equally pronounced non-infectious.

And what sounder evidence have we that leprosy is hereditary? No case of congenital leprosy has been observed, and the disease rarely affects children before the age of five. Leprous parents transmit no cachexia or constitutional degeneration to their offspring. We have no proof that a child born of leprous parents has become leprous, if removed immediately after birth to surroundings free from infection. Not one of the descendants of the one hundred and sixty leprous immigrants to the Northwestern States had become a leper at the time of Hansen's visit in 1887, and in but two of the children born at Molokai has the disease appeared. Without denying the possibility of the transmission of leprosy by descent, its apparent occurrence in any instance should not be accepted without the absolute demonstration of the impossibility of inoculation during or after birth. I believe the theory of heredity to be a very dangerous one, and that the sterner judgment of the Middle Ages, which made

the leper individually the responsible agent rather than the progenitor, must again be adopted before the affection can be exterminated. We are dealing every day with infectious diseases, of the infecting properties of which we have no definite knowledge, and yet we should consider ourselves guilty of criminal conduct, if we should on this account refuse to acknowledge their contagious character. But in the case of leprosy we do know why it should be contagious, and the conditions which should be favorable to its inoculation. The burden of proof that it can be communicated in any other way is wholly with those of a contrary opinion.

THE PREVENTION AND CONTROL OF LEPROSY IN THE UNITED STATES.

If, then, we admit the contagious character of the disease, what measures should be taken for its exclusion from, and repression within our country? Is isolation effective, or necessary, or justifiable? Should immigration from infected nations be prohibited? I have already shown the favorable operation of such stringent measures in past times, the fatal error of their negligence, and the recognition of the necessity of their revival by other nations of the present day. What is our own duty in the matter? We have a considerable and ever-increasing number of lepers amongst us, distributed in numerous foci, which are known. We have individual cases also scattered over the whole country, a small proportion only of which, I believe, are known to physicians, and this is by far the most dangerous class, because they cannot be shunned. We have all met a few of them. They are free to come and go, and dwell where they like. We shall never control or eradicate the disease without resorting to strong measures, and the sooner they are enforced the better. If we wait until their necessity is more apparent, these results will be of far more difficult accomplishment.

I recommend to the serious consideration of this Congress the following propositions:

(1) Every physician should be compelled by State law to report to the nearest board of health the existence of a case of the disease, and the neglect to do so on the part of a medical attendant, or a member of the leper's family, should be a penal offence.

(2) Immigrants affected by the disease should be arrested at ports of entry and along our borders, and turned back to their previous homes by the authority of the national board of health.

(3) Graded hospitals should be established by the National Government, in suitable insular localities where possible, within which both suspected and confirmed cases should be confined, and to which all access should be prevented excepting under proper restrictions.

Such compulsory isolation may be considered cruel to the few, but its longer neglect on our part is certainly a greater cruelty to the many, for in no other way shall we exterminate this most miserable disease. There can be no doubt that the advice of this body would have great influence in determining the action of State and National boards of health in the establishment of such measures for the public safety.

